

THE CLAIMS DEFINING THIS INVENTION ARE AS FOLLOWS:

1. A security device comprising:
a secondary image comprising one or more encoded
5 primary images, each of said one or more encoded primary
images comprising a plurality of regularly sized and
spaced apart primary image elements; and
a decoding mask separated from the secondary
image, the decoding mask having a plurality of regularly
10 spaced apart transparent viewing portions separated by
masking portions, the size and spacing of the viewing
portions being such that when said viewing portions of the
mask, said secondary image and an observer are located in
or more predetermined alignments for each said one or more
15 encoded primary images, the primary image elements from
the secondary image may be observed through the viewing
portions, whereby the corresponding primary image may be
observed along a line of sight corresponding to said
predetermined alignment.
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2. A security device as claimed in claim 1 wherein
the secondary image comprises a plurality of encoded
primary images, the primary images being arranged such
that each of the primary images may be observed in
25 different predetermined alignments of the mask, the
secondary image, and the observer.
3. A security device as claimed in claim 2, wherein
each encoded primary image is arranged in at least partial
30 overlapping relationship with at least one other primary
image with at least one primary image element located
within a boundary of the primary image.
4. A security device as claimed in claim 2, wherein
35 the encoded primary images are related and located
relative to one another so as to produce an animation
effect as successive primary images are observed.

5. A security device as claimed in claim 4, wherein the encoded primary images are related by encoding the same primary image so as to produce an animation effect of 5 the primary image moving.

6. A security device as claimed in claim 4, wherein the encoded primary images are related by encoding similar primary images so as to produce an animation effect of 10 parts of an image moving.

7. A security device as claimed in claim 1, where the area of each image element is in the range $1 \times 10^{-14}\text{m}^2$ to $4 \times 10^{-8}\text{m}^2$.

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8. A security device as claimed in claim 1, where the area of each image element is in the $1 \times 10^{-12}\text{m}^2$ to $2.5 \times 10^{-9}\text{m}^2$.

20 9. A security device as claimed in claim 1, where the image elements are square and each side of the square has a length in the range of $0.1\mu\text{m}$ to $200\mu\text{m}$.

25 10. A security device as claimed in claim 2, wherein the image elements are sized and spaced such that the secondary image comprises four encoded primary images.

30 11. A security device as claimed in claim 2, wherein there are N primary images and N-1 masking portions for each viewing portion.

35 12. A security device as claimed in claim 11, wherein the decoding mask comprises a plurality of evenly spaced, opaque vertical and horizontal lines which define therebetween the viewing portions, the lines providing the masking portions.

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13. A security device as claimed in claim 12, wherein the vertical and horizontal lines are different, contrasting colours to one another.

5 14. A security device as claimed in claim 2, wherein the primary image elements of each encoded primary image are of a different colour to the primary image elements of each of the other encoded primary images.

10 15. A security device as claimed in claim 2, wherein the primary image elements are coloured and the colour and size of the primary image elements are chosen such that the secondary image has the appearance of a grey-scale image.

15 16. A security device as claimed in claim 2, wherein the secondary image has a boundary defining the set of image elements which provide the secondary image and within the boundary any image elements not provided by 20 primary image elements are provided by additional obscuring image elements.

17. A security device as claimed in claim 16, wherein the additional obscuring image elements are randomly 25 selected.

18. A security device as claimed in claim 1, wherein at least one of said secondary image and said decoding mask is printed within a transparent material to thereby 30 prevent tampering.

19. A security device as claimed in claim 1, wherein both said secondary image and said decoding mask are printed within a transparent material to thereby prevent 35 tampering.

20. A security device as claimed in claim 1, wherein

the colours of at least one of the decoding mask and/or at least one of said one or more primary images are chosen to enhance the effect of at least one of said one or more primary images coming into alignment.

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21. A security device as claimed in claim 1, wherein the size of the image elements are chosen to vary such that the primary image elements appear to be the same size at a desired viewing distance.

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22. A security device as claimed in claim 1, wherein said predetermined alignment is chosen such that each of the one or more primary images cannot be observed by an observer observing the security device along a line of sight substantially perpendicular to the plane in which the decoding mask is located.

23. A security device as claimed in claim 22, wherein there is only one primary image.

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24. A security device as claimed in claim 22, wherein there are two different primary images which can be observed along lines of sight at different angles relative to the plane in which the secondary image is located.

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25. A security device as claimed in claim 22, further comprising a blocking mask located on the opposite side of the secondary image to the decoding mask and separated from the secondary image by an additional separator.

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26. A security device as claimed in claim 22, where the area of each image element is in the range $1 \times 10^{-14} \text{m}^2$ to $4 \times 10^{-8} \text{m}^2$.

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27. A security device as claimed in claim 22, where the area of each image element is in the range $1 \times 10^{-12} \text{m}^2$ to $2.5 \times 10^{-9} \text{m}^2$.

28. A security device as claimed in claim 22, wherein the image elements are square and each side of the square has a length in the range of 0.1 μ m to 200 μ m.

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29. A security device as claimed in claim 22, wherein the decoding mask comprises a plurality of evenly spaced opaque vertical lines which define therebetween the viewing portions, the lines providing the masking portions.

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30. A security device as claimed in claim 22, wherein at least one of said secondary image and said decoding mask is printed within a transparent material to thereby prevent tampering.

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31. A security device as claimed in claim 22, wherein both of said secondary image and said decoding mask are printed within a transparent material to thereby prevent tampering.

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32. A security device as claimed in claim 22, wherein the spacing of the image elements is chosen such that a digital image acquirer cannot capture the secondary image.

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33. A security device as claimed in claim 22, wherein the size of the image elements are chosen to vary so that the primary image elements appear to be the same size at a predetermined viewing distance.

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34. A security device as claimed in claim 22, wherein at least some of the other image elements are transparent.

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35. A security device as claimed in claim 24, wherein all the image elements not belonging to either of the primary images are transparent.

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36. A security device as claimed in claim 1, wherein there is only one encoded primary image containing information of interest and wherein said decoding mask is positioned relative to said secondary image such that said 5 primary image can only be observed by an observer observing the security device along a line of sight substantially perpendicular to the plane in which the decoding mask is located.

10 37. A security device as claimed in claim 36, further comprising a blocking mask located on the opposite side of the secondary image to the decoding mask and separated from the secondary image by an additional separator.

15 38. A security device as claimed in claim 36, where the area of each image element is in the range $1 \times 10^{-14}\text{m}^2$ to $4 \times 10^{-8}\text{m}^2$.

20 39. A security device as claimed in claim 36, where the area of each image element is in the range $1 \times 10^{-12}\text{m}^2$ to $2.5 \times 10^{-9}\text{m}^2$.

25 40. A security device as claimed in claim 36, where the image elements are square and each side of the square has a length in the range of $0.1\mu\text{m}$ to $200\mu\text{m}$.

30 41. A security device as claimed in claim 36, wherein the decoding mask comprises a plurality of evenly spaced opaque vertical lines which define therebetween the viewing portions, the lines providing the masking portions.

35 42. A security device as claimed in claim 36, wherein at least one of said secondary image and said decoding mask is printed within a transparent material to thereby prevent tampering.

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43. A security device as claimed in claim 36, wherein both of said secondary image and said decoding mask are printed within a transparent material to thereby prevent tampering.

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44. A security device as claimed in claim 36, wherein the spacing of the image elements is chosen such that a digital image acquirer cannot capture the secondary image.

10 45. A security device as claimed in claim 36, wherein the size of the image elements is chosen to vary so that the primary image elements appear to be the same size at a predetermined viewing distance.

15 46. A security apparatus comprising:
a security device adapted to be provided on or as part of an item to be secured, the security device comprising a secondary image comprising one or more encoded primary images, each of said one or more encoded 20 primary images comprising a plurality of regularly sized and spaced apart primary image elements; and
a decoding mask having a plurality of regularly spaced apart viewing portions separated by masking portions, the size and spacing of the viewing portions 25 being such that at a predetermined separation between the mask and the secondary image and when said viewing portions of the mask, said secondary image and an observer are in one or more predetermined alignments for each said one or more encoded primary images, the primary image 30 elements of the aligned primary image of the secondary image may be observed through the viewing portions, whereby the corresponding primary image may be observed along a line of sight corresponding to said predetermined alignment.

35 47. A security apparatus as claimed in claim 46, wherein said security device comprises a plurality of

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encoded primary images, the primary images being arranged such that each of the primary images may be observed in different predetermined alignments of the mask, the secondary image, and an observer.

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48. Apparatus as claimed in claim 47, wherein each encoded primary image is arranged in at least partial overlapping relationship with at least one other primary image with one or more primary image elements located 10 within a boundary of the at least the other primary image.

49. Apparatus as claimed in claim 47, wherein the encoded primary images are related so as to produce an animation effect as successive primary images are 15 observed.

50. Apparatus as claimed in claim 49, wherein the encoded primary images are related by encoding the same primary image so as to produce an animation effect of the 20 primary image moving.

51. Apparatus as claimed in claim 49, wherein the encoded primary images are related by encoding similar primary images so as to produce an animation effect of 25 parts of the primary image moving.

52. Apparatus as claimed in claim 46, where the area of each image element is in the range $1 \times 10^{-14} \text{m}^2$ to 4 $\times 10^{-8} \text{m}^2$.

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53. Apparatus as claimed in claim 46, where the area of each image element is in the range $1 \times 10^{-12} \text{m}^2$ to 2.5 $\times 10^{-9} \text{m}^2$.

35 54. Apparatus as claimed in claim 46, where the image elements are square and each side of the square has a length in the range of 0.1 μm to 100 μm .

55. Apparatus as claimed in claim 47, wherein the image elements are sized and spaced such that the secondary image comprises four encoded primary images.

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56. Apparatus as claimed in claim 46, wherein the mask comprises a screen formed from a plurality of evenly spaced, opaque vertical and horizontal lines which define therebetween the viewing portions, the lines providing the 10 masking portions

15 57. Apparatus as claimed in claim 56, wherein the vertical and horizontal lines are different colours to one another.

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58. Apparatus as claimed in claim 57, wherein the different colours are chosen to be contrasting.

20 59. Apparatus as claimed in claim 47, wherein the image elements of each of said one or more primary images are of a different colour to the image elements of each of the other primary images.

25 60. Apparatus as claimed in claim 46, wherein the colours of each of said one or more primary images are chosen such that the secondary image has the appearance of a grey-scale image until the decoding mask, the observer and secondary image are in one of said one or more predetermined alignments.

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35 61. Apparatus as claimed in claim 46, wherein the secondary image has a boundary defining the set of image elements which provide the secondary image and within that boundary any image elements not provided by image elements of the encoded primary images are provided by additional obscuring image elements.

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62. Apparatus as claimed in claim 61, wherein the additional obscuring image elements are randomly selected.

5 63. Apparatus as claimed in claim 46, further comprising a transparent separator having a thickness corresponding to said predetermined separation.

10 64. Apparatus as claimed in claim 46, wherein at least one of said security device and said decoding mask is formed on said separator.

15 65. Apparatus as claimed in claim 46, wherein at least one of said security device and said decoding mask is printed within a transparent material to thereby prevent tampering.

20 66. Apparatus as claimed in claim 46, wherein both said security device and said decoding mask are printed within a transparent material to thereby prevent tampering.

25 67. Apparatus as claimed in claim 46, wherein the decoding mask and secondary image are provided at spaced apart locations on the same piece of material in such a manner that the material can be folded so as to locate the decoding mask over the secondary image and move the decoding mask relative to the secondary image to view each of the primary images.

30 68. A method of securing an item comprising: providing a security device adapted to be provided on or as part of an item to be secured, the security device comprising a secondary image comprising one or more encoded primary images, each of said one or 35 more encoded primary images comprising a plurality of regularly sized and spaced apart primary image elements; providing a decoding mask having a plurality of

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regularly spaced apart viewing portions separated by masking portions, the size and spacing of the viewing portions being such that at a predetermined separation between the mask and the secondary image and when said 5 viewing portions of the mask, said secondary image and an observer are in one or more predetermined alignments for each said one or more encoded primary images, the primary image elements of the aligned primary image of the secondary image may be observed through the viewing 10 portions, whereby the corresponding primary image may be observed along a line of sight corresponding to said predetermined alignment.

69. A method of securing an item as claimed in claim 15 68, wherein said security device comprises a plurality of encoded primary images, and method involves arranging the primary images such that each of the primary images may be observed in different predetermined alignments of the mask, the secondary image, and an observer.

70. A method of securing an item as claimed in claim 20 69, further comprising arranging each encoded primary image in at least partial overlapping relationship with at least one other primary image with one or more primary 25 image elements located within a boundary of the at least the other primary image.

71. A method of securing an item as claimed in claim 30 70, further comprising relating the encoded primary images so as to produce an animation effect as successive primary images are observed.

72. A method as claimed in claim 71, wherein the 35 encoded primary images are related by encoding the same primary image so as to produce an animation effect of the primary image moving.

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73. A method as claimed in claim 71, wherein the encoded primary images are related by encoding similar primary images so as to produce an animation effect of parts of the primary image moving.

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74. A method as claimed in claim 69, comprising providing four encoded primary images.

75. Apparatus as claimed in claim 46, comprising providing a screen formed from a plurality of evenly spaced, opaque vertical and horizontal lines which define therebetween the viewing portions, the lines providing the masking portions

15 76. A method as claimed in claim 75, wherein the vertical and horizontal lines are different colours to one another.

20 77. A method as claimed in claim 76, wherein the different colours are chosen to be contrasting.

25 78. A method as claimed in claim 68, comprising selecting the colours of each of said one or more primary images such that the secondary image has the appearance of a grey-scale image until the decoding mask, the observer and secondary image are in one of said one or more predetermined alignments.

79. A method as claimed in claim 68, further 30 comprises providing a transparent separator having a thickness corresponding to said predetermined separation.

80. A method as claimed in claim 79, comprising providing at least one of said security device and said 35 decoding mask is formed on said separator.

81. A method as claimed in claim 79, comprising

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providing at least one of said security device and said decoding mask by printing it within a transparent material to thereby prevent tampering.

5 82. A device as claimed in claim 1, wherein portions of said secondary image are separated from said decoding mask by different predetermined distances.